



SKIN OF LOWER LIMB

A- Buttock (Gluteal region) :-

* Cutaneous nerves of the buttock are :-

① Upper medial quadrant :- by :

- Posterior rami of upper three lumbar & upper three sacral nerves ($L_1, 2, 3, S_1, 2, 3$).

② Upper lateral quadrant :-

- Lateral branches of subcostal ^(T₁₂) & iliohypogastric nerves (L_1)

③ Lower lateral quadrant :-

- branches of Lateral cut. nerve of thigh ($L_2, 3$).

④ Lower medial quadrant :-

- branches of Posterior cut. nerve of thigh ($S_1, 2, 3$)

⑤ Skin over coccyx :- (in natal cleft "between buttock")

- branches of lower sacral & coccygeal nerves.

B- The thigh

① Lateral cut. branch of subcostal nerve (T_{12}) :-

- Supplies skin below lateral part of inguinal ligament.

② Femoral branch of genitofemoral nerve ($L_1, 2 \rightarrow$ lumbar plexus) :-

- Supplies skin below middle part of inguinal ligament

- (Genital branch supplies cremasteric muscle),

- (it enters thigh behind ^{middle of} inguinal ligament).

③ Ilioinguinal nerve ($L_1 \rightarrow$ lumbar plexus) :-

- Supplies skin below medial part of inguinal ligament & skin of root of Penis (clitoris) & anterior skin of scrotum (labium ^{major})

- (it enters thigh through superficial inguinal ring).

④ Obturator nerve (L₂₋₃₋₄ → Lumbar plexus) :- (by ant. division) :-

- Supplies small area over medial aspect of the thigh.

⑤ Lateral cut. N. of thigh (L₂₋₃ → lumbar plexus) :-

- Supplies skin of lateral aspect of thigh & knee, buttock
(lower lateral)
- (enters thigh behind lateral end of inguinal ligament & divides into anterior & posterior divisions).

⑥ Intermediate cut. N. of thigh :- (from femoral N. L₂₋₃₋₄) :-

- Supplies anterior aspect of thigh.
- (divides into two branches, joins patellar plexus).

⑦ Medial cut. N. of thigh (femoral N. L₂₋₃₋₄) :-

- supplies medial aspect of thigh, joins patellar plexus.

⑧ Patellar Plexus

- Lies in front of knee joint, formed by Lat. cut. N. of thigh
interm. " " " "

⑨ Posterior cut N. of thigh (S₁₋₂₋₃ → sacral plexus) :-

Medial " " " "
infrapatellar br. of saphenous N.

- Supplies posterior aspect of thigh.
- (enters gluteal region through greater sciatic foramen "GSF" below Piriformis & descends Postero-medial to sciatic Nerve up to Knee)
- Branches are 1-skin of thigh (Posterior aspect) & Popliteal fossa.
2-skin of buttock (lower medial quadrant)
3-skin of scrotum "labium majus in ♀" (Posterior aspect)

C-The leg**① Saphenous nerve (femoral N. L₂₋₃₋₄) :-**

- Supplies anteromedial aspect of leg. (also medial border of foot upto base "ball" of big toe). also Postero-medial aspect of leg.

② Lateral cut. N. of calf : (common Peroneal N.) :-

- Supplies upper part of antero-lateral aspect of leg (the lower part of antero-lateral aspect by Superficial Peroneal N.)
- also supplies upper part of postero-lateral aspect of leg.

③ Sural nerve (Tibial nerve) :-

- Supplies lower part of Postero-lateral aspect of leg (also lateral border of foot upto tip of little toe).

D- The foot

① Superficial Peroneal N. (common Peroneal N.) :-

- supplies skin on dorsum of foot & medial side of big toe and adjacent sides of 2nd, 3rd & 4th toes. (1st toe)

② Deep peroneal N. (common P. N.) :-

- supplies adjacent sides of 1st & 2nd toes.

③ Saphenous N. (femoral N.) :-

- supplies medial side of foot until head of 1st metatarsal bone (ball of big toe).

④ Sural N. (tibial N.) :-

- supplies lateral side of foot & lateral side of little toe (5th toe).

⑤ Medial Plantar N. (tibial) :-

- supplies medial 2/3 of sole & skin of terminal phalanges of medial 1 & 1½ toes (dorsally).

⑥ Lateral Plantar N. (tibial) :-

- supplies lateral 1/3 of sole & skin of dorsum of terminal phalanges of lateral 1 & 1½ toes.

⑦ Medial calcaneal N. (tibial)

- supplies medial side of the heel.

SUPERFICIAL VEINS OF LOWER LIMB

A- Dorsal venous arch:-

- * Site :- over heads of metatarsal bones.
- * Tributaries :- receives digital veins & veins from sole.
- * End :- forming Great & small saphenous veins.

B- Great saphenous vein :- "Long saphenous v."

- * Beginning :- from medial end of dorsal venous arch.
- * End :- by draining into femoral vein about 4 cm (1.5 inch) below & lateral to pubic tubercle (by passing saphenous opening)
- * Course :- passes in front of medial Malleolus & ascends in superf. fascia over medial aspect of leg (accompanied by saphenous N.)
 - Passes behind the Knee (joining small saphenous)
 - Curves forward around medial aspect of thigh, passes through saphenous opening piercing cribriform fascia.
 - It has numerous valves & connected with deep veins of lower limb by perforating veins (① at mid of thigh, ② just below knee, ③ above medial malleolus by 5, 10 & 15 cm).

* Tributaries of great saphenous vein

- ①- superficial circumflex iliac vein.
- ②- superficial epigastric vein.  it joins lateral thoracic vein to form thoraco-epigastric vein (joining SVC & IVC)
- ③- superficial external pudendal vein.
- ④- accessory vein.
- ⑤- unnamed veins.

Applied anatomy :-

- ①- intravenous infusion (venous cutdown)
- ②- may be used as graft for diseased coronary
- ③- if dilated, tortuous called varicose veins.

C- **Small saphenous vein** "short saph."

* Beginning:- from lateral end of dorsal venous arch.

* End :- by draining into Popliteal vein.

* Course :- Ascend behind lateral malleolus (accompanied by sural N.)
 - follows lateral border of tendo-calcaneus.

- runs up to middle of back of leg, pierces deep fascia
 and passes between 2 heads of gastrocnemius in lower
 part of popliteal fossa.

* Tributaries:- ① small veins from back of leg.

② anastomosing vein with great saphenous vein.

③ communicating veins with foot deep veins.

LYMPHATICS OF LOWER LIMB

"Inguinal Lymph nodes"

(I) - INGUINAL L.N.

A. Superficial inguinal L.N. :-

① Horizontal group :-

- Lies below (& parallel) to inguinal ligament.
- Divided into :-
 - a- Medial members receive lymph vessels from
 - anterior abdominal wall below umbilicus.
 - Perineum (urethra, lower $\frac{1}{2}$ of anal canal & external genitalia of both sexes) except testis
 - b- Lateral members receive lymph vessels from
 - back below iliac crest.

② Vertical group :-

- Lies along terminal part of great saphenous vein
- receives lymph from most of superficial lymphatic of lower limb.

NB :- Efferent lymph vessels from superficial inguinal LN pass through saphenous opening to join deep inguinal LN which pass through femoral canal to join ^{external} iliac Lymph Nodes.

B. Deep inguinal L.N. :-

- Lies under fascia lata along medial side of femoral vein
- Efferent: passes into ext. iliac LN through femoral canal.
- Afferent: from
 - ① superficial inguinal LN-
 - ② most of deep structures of lower limb-
 - ③ efferent from popliteal LN.

II- POPLITEAL L.N. :-

- About 6 Lymph nodes, Lies embedded in fatty C.T of popliteal fossa
- {Afferents from}
 - superficial lymphatic along small saphenous vein
(from lateral side of foot & lateral side of leg & knee)
 - deep lymphatic along anterior & posterior tibial arteries
- {Efferents to} deep inguinal LN through adductor canal (by accompanying femoral artery)

SUPERFICIAL FASCIA OF L.L.

- It is differentiated into
 - ① superficial fatty layer.
 - ② Deep membranous layer.
- The two layers are continuation of that of ^{anterior} abdominal wall.
- Contents of superf. fascia :- 1- veins → great & small saphenous (with tributaries)
2- arteries → the three superficial br. of femoral a
3- Lymph → superficial inguinal LN.
4- Nerves → cutaneous nerves
- The membranous layer is attached with deep fascia of the thigh (fascia lata) along a horizontal line just below inguinal ligament

NB: this fusion prevent the escape of urine to the thigh during injury of urethra.

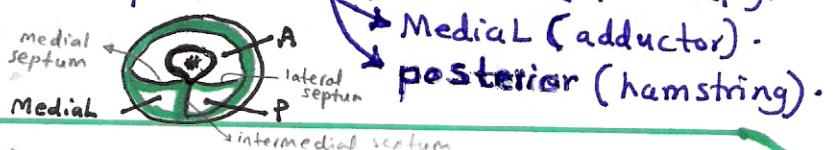
Buttock:-

- superficial fascia of gluteal region is thick in women with large quantities of fat giving prominence of buttock.

DEEP FASCIA OF LOWER LIMB

I- Thigh "Fascia lata"

- Attached above to inguinal ligament & hip bones, and below to bony prominences around the knee
- Thickened laterally to form iliotibial tract
- At upper medial part perforated by saphenous opening.
- Sends \exists intermuscular septa to linea aspera of femur which divides the thigh into \exists compartments



* Iliotibial tract :- (1-2 inch wide)

- Thickened band of fascia lata at lateral aspect of thigh.
- Attached above to iliac tubercle (& part of crest) and below to the lateral condyle of tibia (anterolat. aspect)
- It steadies the hip & knee joints during limb extension in erect position
- It gives insertion to
 - ①- Tensor fascia lata.
 - ②- Gluteus maximus (superficial 3/4).

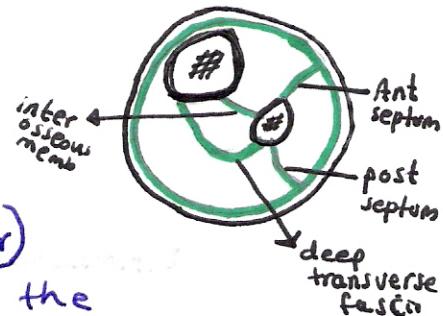
* Saphenous opening :-

- Opening in fascia lata about 4cm (1½ inch) below & lateral to the pubic tubercle.
- Covered by cribriform fascia which is perforated by
 - 1- (vein) \rightarrow great saphenous vein.
 - 2- (lymph) \rightarrow lymphatics from superficial to deep inguinal LN.
 - 3- (Arteries) \rightarrow
 - Superficial circumflex iliac artery
 - Superficial epigastric.
 - Superficial external pudendal \wedge

$\left. \begin{array}{l} \text{from femoral} \\ \text{a} \end{array} \right\}$
- The upper, lateral & lower margins of saphenous opening forms the falciform margin which pass behind femoral vessel to attach to pecten line

II - LEG :-

- Deep fascia of the leg send 2 intermuscular septa (anterior & posterior) to fibula.
- The 2 septa & interosseous membrane* divide the leg into 3 compartments (anterior, lateral & posterior)
- Thickened in front & back of ankle to form the extensor & flexor retinacula respectively (see later).



III - FOOT

- Deep fascia thickened in the sole to form Plantar aponeurosis
- Plantar aponeurosis is triangular in shape (with apex & base)
- Apex attached to medial & lateral tubercles of calcaneum.
- base divides at base of toes into 5 slips each slip divided into 2 bands, one passing to the skin & other deep band is divided into 2 parts arounds flexor tendons & fuse with the fibrous flexor sheath & deep transverse ligament.
- Medial & lateral borders of aponeurosis send fibrous septa into sole forming fascial spaces of the sole.
- Plantar aponeurosis
 - give attachment of overlying skin
 - Protect vessels, nerves & tendons of sole.
 - Assist in maintaining the arches of foot.

IV - BUTTOCK

- Continuous below with fascia lata of thigh.
- It splits in gluteal region to enclose gluteus maximus & above gluteus maximus becomes one layer that cover gluteum medius that attached to iliac crest.
- In lateral side forms iliotibial tract.

FEMORAL TRIANGLE

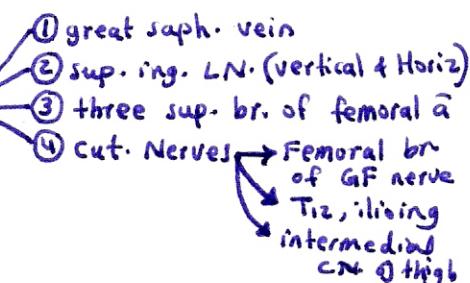
— Triangular intermuscular space in upper medial $\frac{1}{3}$ of thigh.

* Boundaries :-

- Superior (base): inguinal ligament
- Laterally:— Medial border of sartorius.
- Medially:— Medial border of adductor longus.

* Roof (anterior wall):—

- Skin & superficial fascia (with its contents)
- Deep fascia (lata) with saphenous opening.



* Floor (from Lat. to Medial):—

- Iliacus, Psoas, pectineus & adductor longus

* Contents :-

- 1—(Nerve):— Femoral nerve & its branches., Lat. cut. N. of thigh.
- 2—(Artery):— Femoral artery & its branches.
- 3—(vein):— Femoral vein & its tributaries. } covered by Femoral sheath.
- 4—(LN):— deep inguinal LN.

— Fatty c.T.

* Femoral sheath:—

(Femoral N. outside F. sheath)

- Fascia ^{surrounds} femoral vessels for about 1 inch below ing. lig.
- Anterior wall is continuation of fascia transversalis ^{ant. abd. wall} while posterior wall is continuation of fascia iliaca. ^{post abd. wall}.
- Compartments of femoral sheath are
 - Medial \rightarrow Femoral canal.
 - Intermediate \rightarrow Femoral vein.
 - Lateral \rightarrow Femoral artery & Femor br. of genitofemoral N.

* Femoral canal:—

- Medial compartment of femoral sheath, about $\frac{1}{2}$ inch. \rightarrow For expansion of femoral vein.
- Its upper opening called Femoral ring & closed by Femoral septum.
- Contents are ① Fatty c.T. ② one deep inguinal LN (Cloquet LN).
③ efferent lymph vessels from deep ing. LN.

lower end of canal adheres to tunica adventitia of femoral vein.

* Femoral ring :-

- Upper opening of femoral canal, closed by femoral septum (condensation of extraperitoneal tissue).
- Boundaries :-
 - Anterior :- inguinal ligament.
 - Medial :- Lacunar ligament.
 - Posterior :- Pectenial Lig. (& Superior ramus of pubis)
 - Lateral :- femoral vein.

* Femoral hernia :-

- Protrusion of peritoneum into the femoral canal through the femoral ring (as canal is a weak area in abdomen).
- It is more common in female. due to wide pelvis (wide ring).

ADUCTOR CANAL

"Subsartorial ; Hunter's canal"

- Intermuscular cleft on medial aspect of middle 1/3 of thigh.
- Begins above at apex of femoral triangle.
- Ends below at adductor hiatus (opening in adductor magnus ms).
- It is triangular in cross section.

* Boundaries :- Roof (anteromedial) :- sartorius & fascia.
 - Lateral (anterolateral) :- vastus Medialis.
 - Posterior wall :- adductor longus & magnus

* Contents :- ① (Nerve) :- Saphenous nerve, obturator N. (terminal part) & N. to vastus medialis. subsartorial plexus of nerves

② (Artery) :- femoral artery. (& descending genicular br.)

③ (vein) :- femoral vein.

④ (LN) :- deep lymph vessels (connect popliteal LN. to deep ^{ing.} LN.)
 → deep to fascia lata

N.B. subsartorial plexus formed inside canal at lower border of add. longus by
 ① saphenous N. ② Med. C.N. of thigh ③ ant. division of obturator N.
 gives few cut. filaments

POPLITEAL FOSSA

- Diamond-shaped intermuscular space at back of knee.

* **Boundaries**:-

- Superio-lateral:- Biceps femoris.

- Superio-Medial: Semitendinosus & semi membranosus.

- Infero-lateral:- lateral head of gastrocnemius & Plantaris.

- Infero-Medial:- Medial head of gastrocnemius.

* **Floor (deep) (anterior wall)**:-

- Popliteal surface of femur.

- Popliteus muscle.

- Posterior ligament (capsule) of knee.

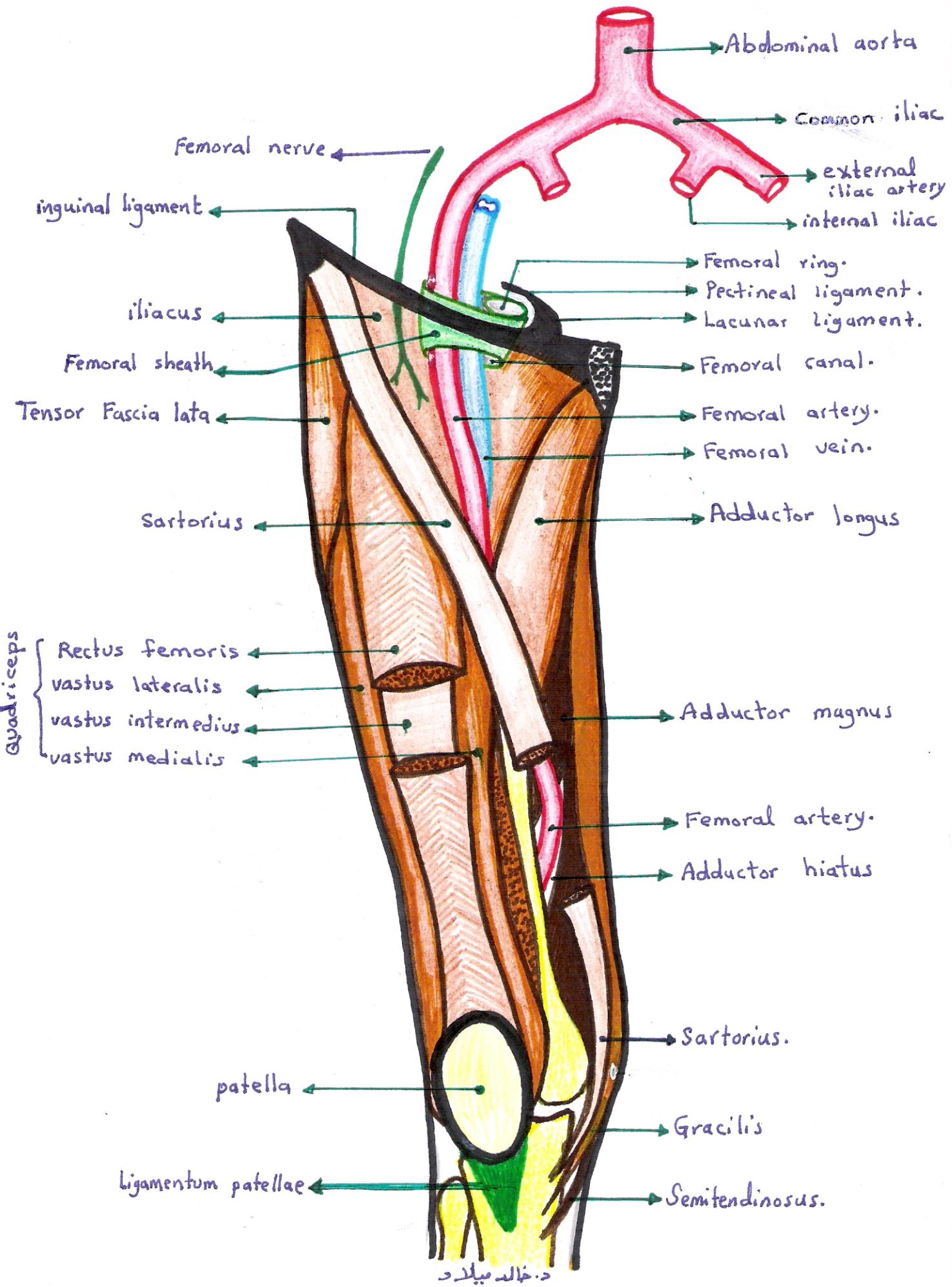
* **Roof (superf.) (posterior wall)**:-

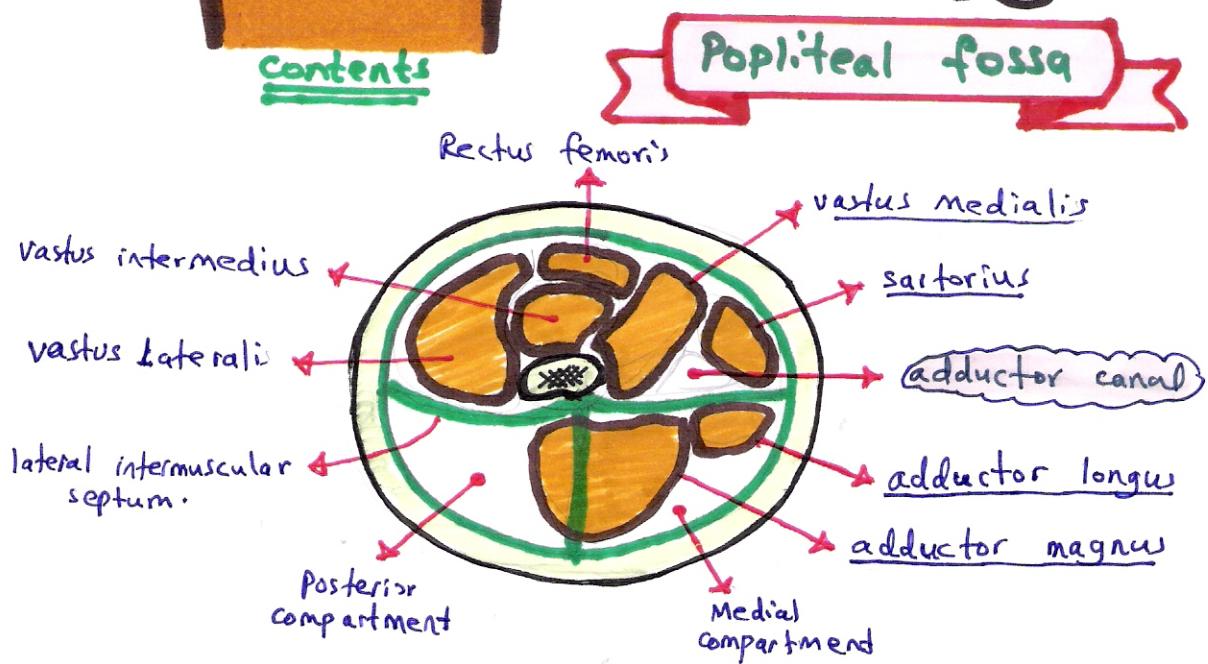
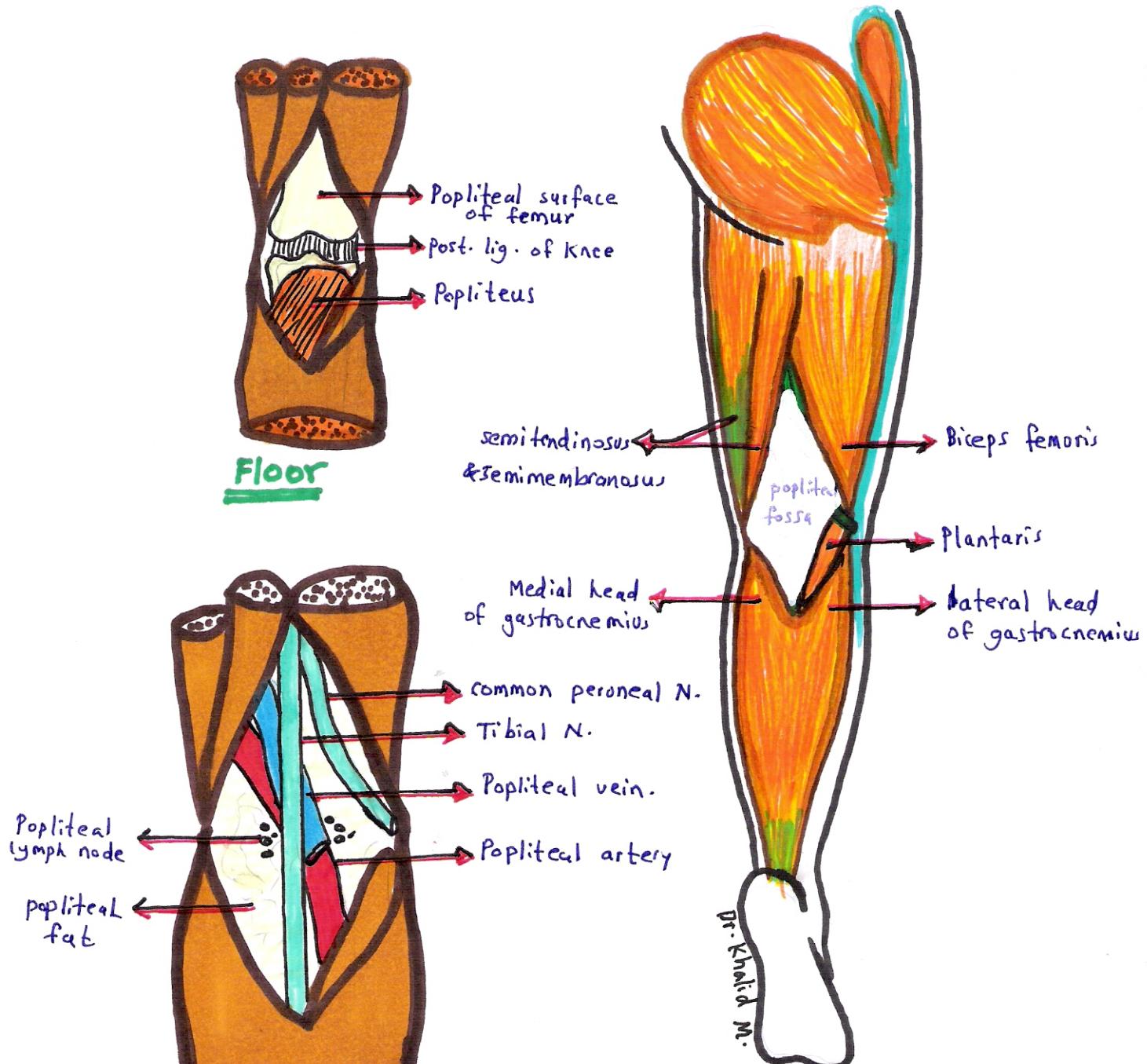
- Skin .

- superficial & deep fascia.

* **Contents of the fossa**

- (Nerve):- Tibial & common peroneal nerves.
+ genicular br. of obturator N.
- (Artery):- Popliteal artery.
- (Vein):- Popliteal vein (with ^{part of} small saphenous vein).
- (LN):- Popliteal LN.
- Fatty connective tissue.





THE GLUTEAL REGION

- The gluteal region is bounded superiorly by iliac crest & inferiorly by fold of the buttock.

SKIN :- see skin of lower limb (Page 1) \rightarrow Buttock

SUPERFICIAL FASCIA :- see (page 7).

DEEP FASCIA :- see (page 9)

LIGAMENTS :- Sacrospinous & Sacrotuberous \rightarrow see pelvis (Page 5).

FORAMINA :- The greater & lesser sciatic foramina.

- They are formed by conversion of greater & lesser sciatic notches to foramina by sacrospinous & sacrotuberous ligaments.
- GSF (Greater Sciatic Foramen) provides exit from pelvis to gluteal region.
- LSF (lesser s. F.) provides enterance into perineum from gluteal region

* Structures Passing through GSF :-

- ① Piriformis
- ② Superior gluteal nerve & vessels.
- ③ Inferior gluteal nerve & vessels.
- ④ Sciatic nerve.
- ⑤ Posterior cut. Nerve of thigh.
- ⑥ pudendal nerve.
- ⑦ internal pudendal vessels.
- ⑧ Nerve to obturator internus.
- ⑨ Nerve to quadratus femoris.

\rightarrow NB: ② Pass above piriformis but others below it in GSF

* Structures Passing through LSF :-

- ① obturator internus.
- ② pudendal nerve.
- ③ internal pudendal vessels.
- ④ Nerve to obturator internus.

NERVES OF GLUTEAL REGION

1. Sciatic Nerve :- see Nerves of lower limb.

2. Posterior cutaneous N. of thigh :-

- branch of sacral plexus (S_1, S_2, S_3)
- Enters gluteal region through greater sciatic foramen below piriformis
- Passes downward on posterior aspect of sciatic N. deep to the gluteus maximus then superficial to biceps femoris deep to fascia lata & in popliteal fossa pierces deep fascia.
- Branches are cutaneous to
 - Gluteal br. to lower medial $\frac{1}{4}$ of buttock
 - Perineal br to back of scrotum (or labium ^{magus})
 - Skin of back of thigh, popliteal upper leg.

3. Inferior gluteal Nerve :- (L_5, S_1, S_2) sacral plexus.

- leaves pelvis through GSF below piriformis close to Post. cut. N. of thigh.
- Ends by supplying gluteus maximus.

4. Superior gluteal Nerve :- (L_4, S_1, S_2) sacral plexus.

- leaves pelvis through GSF above piriformis.
- runs between Gluteus medius & minimus supplying them. & tensor fascia lata

5. Nerve to quadratus femoris :- (L_4, S_1, S_2) sacral plexus.

- leaves pelvis through GSF below piriformis
- runs deep to sciatic N., sup. & inf. gemelli & tendon of obturator ^{internus}
- supplies quadratus femoris & inferior gemellus.

6. Nerve to obturator internus :- (L_5, S_1, S_2) sacral plexus.

- leaves pelvis through GSF below piriformis
- crosses ischial spine & reenter pelvis through lesser sciatic foramen
- supplies obturator internus & superior gemellus.

7. Pudendal nerve :- (S_2, S_3, S_4) sacral plexus.

- leaves pelvis through GSF below piriformis
- crosses ischial spine & reenter pelvis through LSF

ARTERIES OF LOWER L.

2007

I. FEMORAL A.

** Begining :- at inguinal ligament as a continuation of external iliac artery. at midinguinal point.

** End :- at adductor hiatus by becoming popliteal artery

** Course :- Enters the thigh behind inguinal Lig. inside the femoral sheath (at midinguinal point).

Then enters the femoral triangle & leaves the apex of triangle entering into adductor canal where it ends at adductor hiatus becoming popliteal artery
" it descends vertical toward adductor tubercle of femur

** Relation :- in the femoral Δ - lateral → femoral nerve.

Medial → femoral vein.

anterior → skin & fascia.

posterior → Psoas & pectineus.

- in adductor canal - anteromedial → Sartorius.

antero lateral → vastus medialis.

posteriorly → add. longus & magnus.

N.B :- the femoral a descends first lateral to femoral vein (at femoral sheath) then in front of the vein (at apex of femoral Δ) then finally medial to the vein (at adductor hiatus).

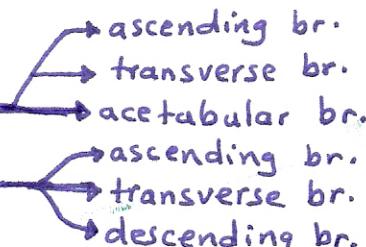
Ⓐ → L.S.M

N.B :- so the femoral vein ascends first Lateral to artery (at add. hiatus) the deep posterior to artery (at apex of femoral Δ) the finally medial to artery (at femoral sheath)

**Branches of femoral artery:

- ① Superficial circumflex iliac a. → (runs toward ASIS).
- ② Superficial epigastric a. → (runs toward umbilicus).
- ③ Superficial external pudendal a. → (supply scrotum or labium majus).
- ④ Deep external pudendal a. → (supply scrotum or labium majus).
- ⑤ Profunda femoris a.
- ⑥ Descending genicular a (the last br.). → (supply knee joint)

PROFUNDA FEMORIS A. :-

- **Beginning** :- It is the largest br. of femoral artery from Lateral border [4 cm below inguinal lig.].
- **End** :- ends by becoming the 4th perforating branch.
- **Course** :- Arise from Lateral border of femoral a then passes medially behind the artery [between pecten & add. longus] - enters medial compartment & sends 4 perforating branches to the posterior compartment.
- **Branches** :- 
 - ① Medial circumflex femoral a - gives
 - ② Lateral circumflex femoral a - gives
 - ③ three perforating branches.
 - ④ Ends as the fourth perforating branch.

N.B :- Head of femur (HOF) is supplied by :-

- ① artery of Ligament of HOF (Lig. teres)
- ② acetabular branches of - medial circumflex a - obturator a (post. division).

II. OBTURATOR A.

- Beginning: - branch of internal iliac artery. (anterior division).
- End: - by dividing into anterior & post. divisions.
- Course: - Enters the thigh (with obturator N.) through the obturator canal to medial compartment of thigh
- Branches: - ① Visceral: - to urinary bladder.
- ② Muscular: - to neighboring muscles.
- ③ Articular: to hip joint (enters into Lig. of head of femur (Ligamentum teres) to supply head of femur)
- ④ Pubic branch.

N.B - the pubic br. anastomose with the pubic branch of inferior epigastric artery (which replace obturator artery in 30% of people & descend in free margin of Lucunar Lig. → this is dangerous during operation of femoral hernia -)

* OBTURATOR VEIN:

- drains into internal iliac vein. & receives tributaries that corresponds to branches of the artery.

* FEMORAL VEIN:

- Starts at add. hiatus as continuation of popliteal vein &
- Ends at femoral sheath (ing. Lig.) becoming external iliac vein.
- Tributaries are ① great saphenous vein.
- ② Deep external pudendal vein.
- ③ Descending genicular vein.
- ④ Medial & lateral circumflex femoral veins.
- ⑤ Profund femoris vein.

III- POPLITEAL A. :

- **Beginning**:- at add. hiatus as continuation of femoral a.
- **End** :- at lower border of popliteus muscle by dividing into anterior & posterior tibial arteries.
- **Course**:- descends in popliteal fossa: first medial to popliteal vein then deep to it & finally lateral to the vein

A → M. D. L so the popliteal vein ascend in the fossa first
 V → M. S. L medial to artery then superficial & finally lateral to the popliteal artery (alway between the a & tibial nerve)

- **Relation**:- anterior (from above downward) :

- ① popliteal surface of femur.
- ② knee joint.
- ③ popliteus ms.

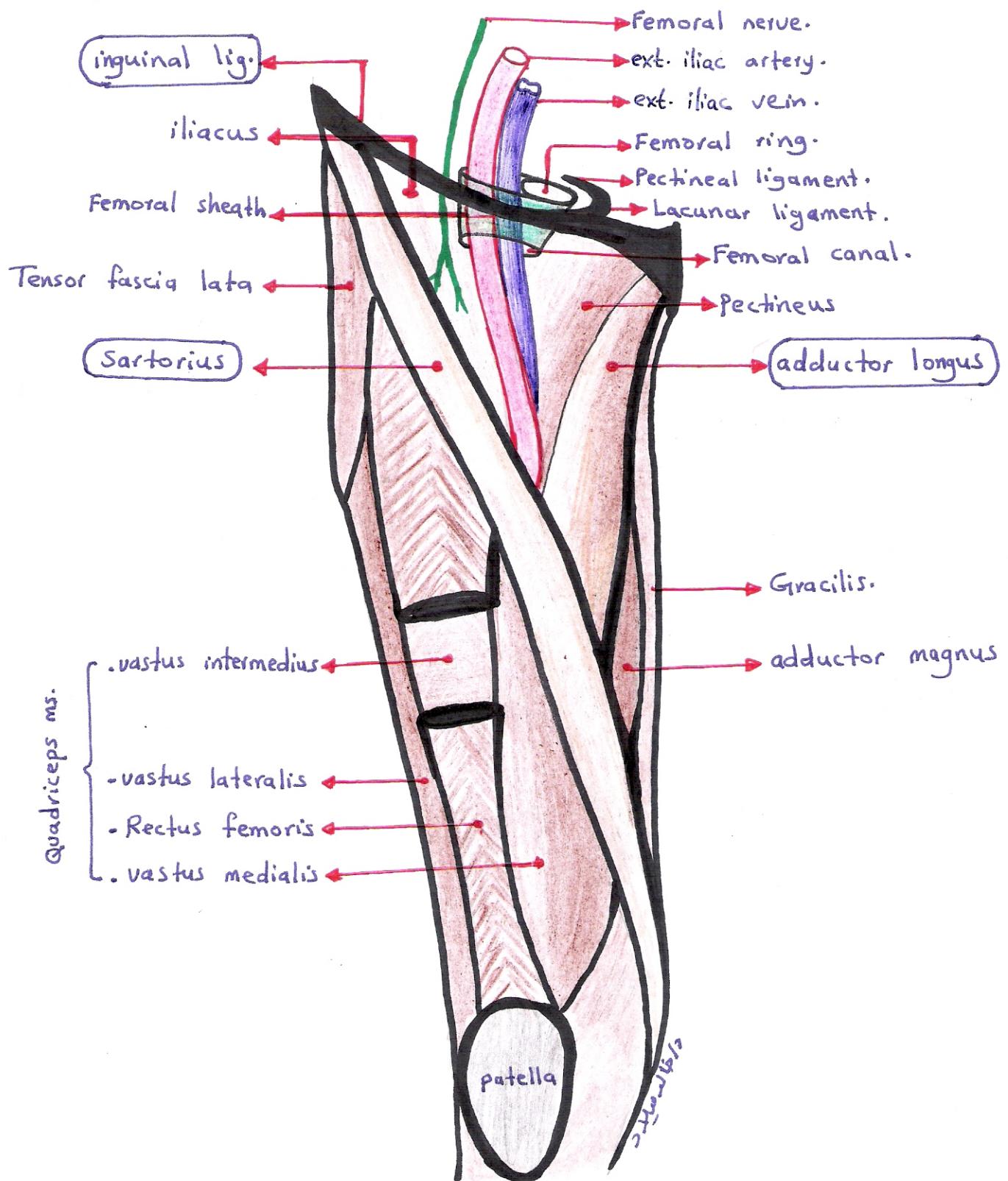
- posterior (from superficial to deep) :

- ① skin & fascia.
- ② tibial nerve.
- ③ popliteal vein.

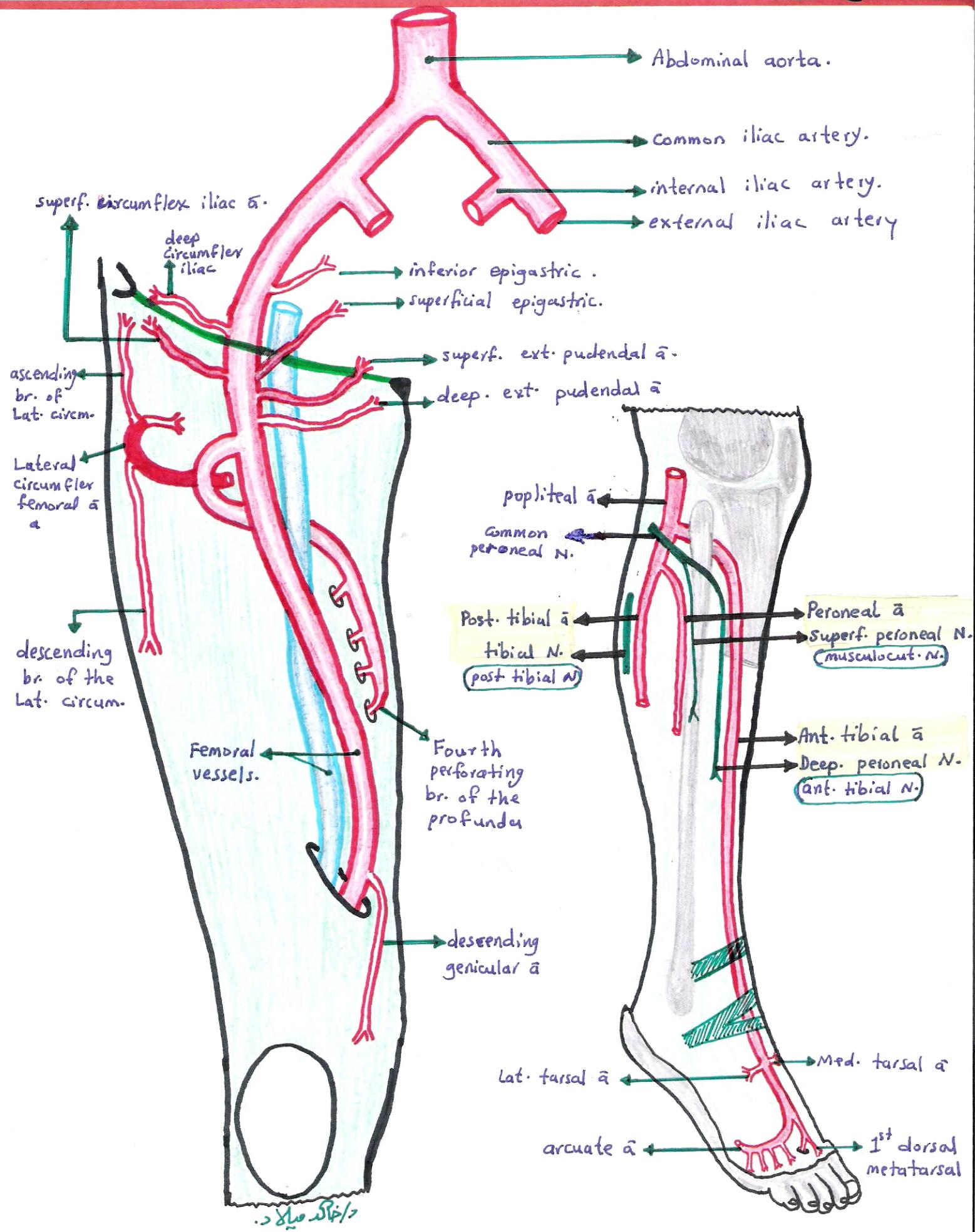
- **Branches**:- the branches are:-

- ① Muscular :- to muscles beside.
- ② anterior & posterior tibial arteries (terminal br.).
- ③ Middle genicular artery.
- ④ Superior medial genicular a.
- ⑤ " Lateral " "
- ⑥ Inferior medial " "
- ⑦ " Lateral " "

N.B:- the popliteal vein start at lower border of popliteus by union of vena commitantes of ant & post. tibial arteries
 - end at add. hiatus becoming femoral vein.
 - receive tributaries as br. of the artery + small saphenous v.



Femoral triangle



IV - ANTERIOR TIBIAL A.

- **Beginning:** The smaller terminal br. of popliteal artery at the lower border of popliteus ms.
- **End:** continuous as dorsalis pedis artery in front of ankle.
- **Course:** - enters the ant. comp. of leg through opening in the upper part of interosseous membrane.
 - running down with deep peroneal nerve.
 - leaves the leg by passing deep to superior extensor retinaculum [between ext. hallucis longus → medially & deep peroneal N. & ext. digitorum longus → laterally], here the artery is superficial & can be palpable.
- **Branches:**
 - ① Muscular: to muscles beside it.
 - ② Nutrient: to the bones.
 - ③ Anterior & posterior tibial recurrent arteries.
 - ④ Medial & lateral Malleolar arteries.

N.B - Continues as dorsalis pedis artery.

DORSALIS PEDIS A.

- **Beginning:** continuation of anterior tibial artery in front of ankle.
- **End:** in the sole of foot between 1st & 2nd toes to join the plantar arch.
- **Course:** descend in dorsum of foot just lateral & parallel to tendon of extensor hallucis longus between big & second toes.
- **Branches:**
 - ① Medial & lateral tarsal arteries.
 - ② First plantar ^{& dorsal} metatarsal artery → gives digital to big toe & medial side of second toe.
 - ③ Arcuate artery: → gives 4 metatarsal arteries → gives digital branches to lateral 3 and $\frac{1}{2}$ fingers.

IV POSTERIOR TIBIAL A.

- **Beginning:** The larger terminal br. of popliteal artery at the lower border of popliteus muscle.
- **End:** By dividing into medial & lateral plantar arteries behind medial malleolus (deep to flexor retinaculum).
- **Course:** Enters the post. compart. of leg between [soleus & gastrocn.] above it & [tibia & tibialis posterior ms] below it.
 - Running with tibial nerve [the nerve first medial then superficial & finally lateral to artery].
 - In the lower part of leg is superficial covered only by skin & fascia (in front of medial border of tendocalcaneus)
- **Branches:**
 - ① Muscular :- to muscles beside.
 - ② Nutrient :- to tibia.
 - ③ Peroneal artery & communicating br. to peroneal a.
 - ④ Medial malleolar.
 - ⑤ Medial calcaneal.
 - ⑥ Medial plantar
 - ⑦ Lateral plantar] terminal.
 - ⑧ Circumflex fibular.

PERONEAL A.

- **Beginning:** from Posterior tibial artery
- **End:** behind inferior tibiofibular joint dividing into calcaneal br.
- **Course:** running in Lat. comp. with superficial peroneal nerve.
- **Branches:**

① Muscular br.	② Nutrient: to fibula.
③ Lateral malleolar	④ Lateral calcaneal.
⑤ Perforating branch.	⑥ Communicating br. to Posterior tibial a

↓
joint Lat tarsal br.
of dorsalis pedis

ANASTOMOSIS OF LOWER L. 2007

I. TROCHANTRIC ANAS.:

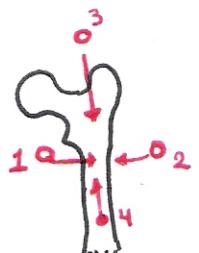
* It is formed by branches of:-

- ① Superior gluteal \bar{a} . \rightarrow [From internal iliac \bar{a} (post. division)]
- ② Inferior gluteal \bar{a} . \rightarrow [from internal iliac \bar{a} (ant. division)]
- ③ Medial circumflex \bar{a} \rightarrow [from profunda femoris (femoral \bar{a})]
- ④ Lateral circumflex \bar{a} \rightarrow [from profunda femoris (femoral \bar{a})]

II. CRUCIATE ANAST.:

* It is formed at level of lesser trochanter by:-

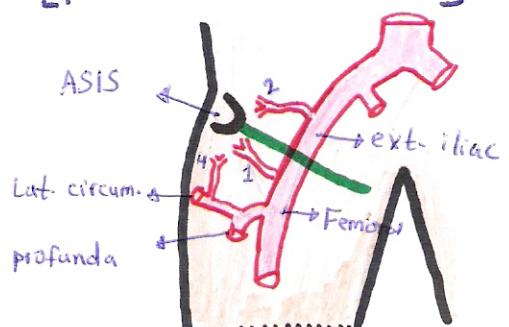
- ① Transverse br. of medial circumflex \bar{a} .
- ② Transverse br. of Lateral circumflex \bar{a} .
- ③ Descending br. of inferior gluteal \bar{a} .
- ④ Ascending br. of 1st perforating br. of profunda femoris



III. AROUND ASIS.:

* anastomosis around anterior superior iliac spine by:-

- ① Superficial circumflex iliac \bar{a} . \rightarrow [femoral \bar{a}].
- ② Deep circumflex iliac \bar{a} . \rightarrow [external iliac \bar{a}].
- ③ Superior gluteal artery \rightarrow [internal iliac \bar{a}].
- ④ Ascending br. of Lateral circumflex \bar{a} \rightarrow [profunda \rightarrow femoral \bar{a}].



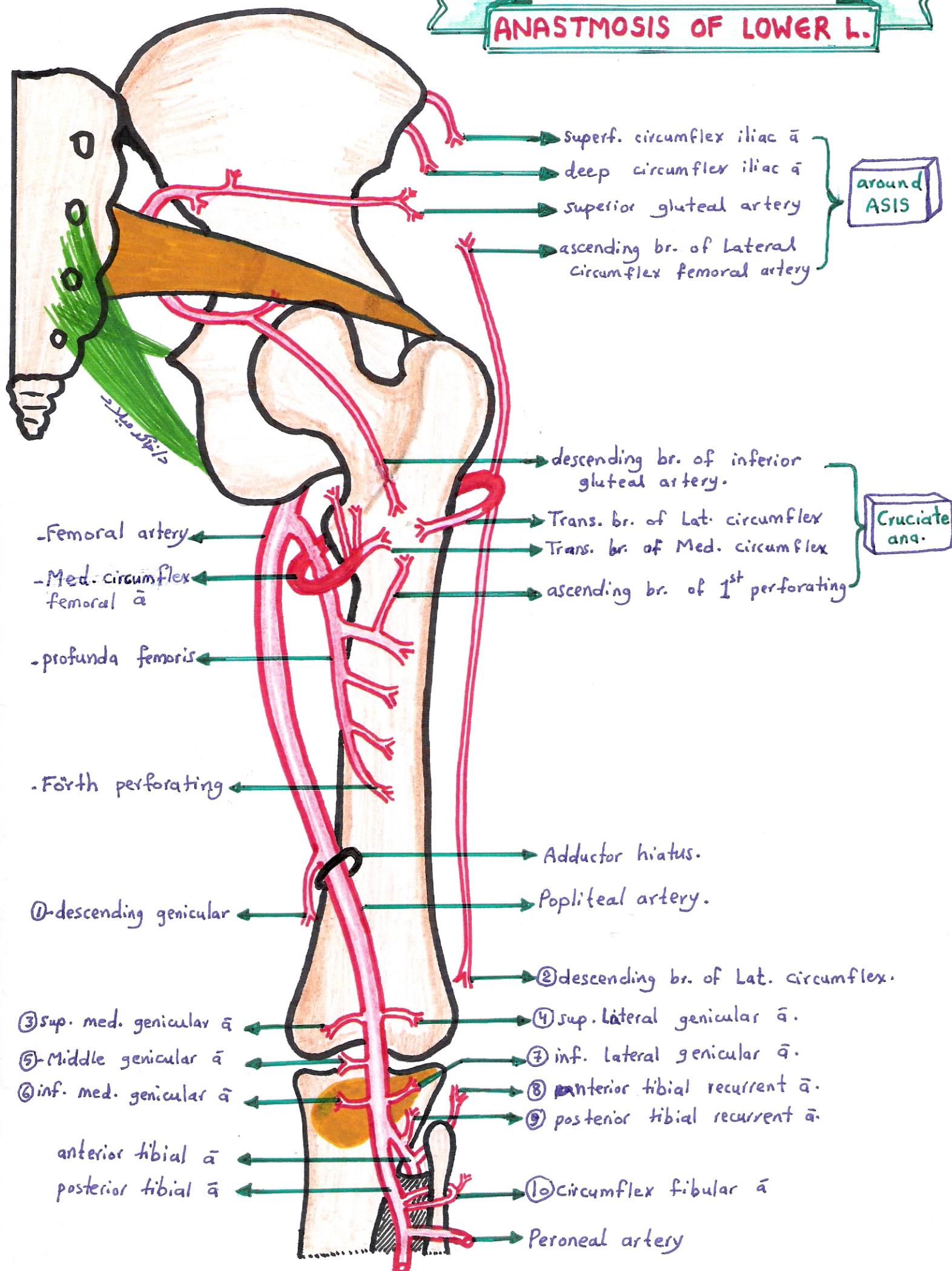
IV - AROUND KNEE :

* It is formed by :-

- ① Descending genicular artery → Femoral \bar{a} .
- ② descending br. of Lateral circumflex \rightarrow profunda
- ③ Middle genicular artery
- ④ Superior medial genicular \bar{a}
- ⑤ Superior lateral " "
- ⑥ Inferior medial " "
- ⑦ Inferior lateral " "
- ⑧ Anterior tibial recurrent \bar{a}
- ⑨ Posterior " " " " → anterior tibial \bar{a} .
- ⑩ Circumflex fibular artery \rightarrow posterior tibial \bar{a} .

N.B: - Trochanteric anastomosis provides main blood supply to the neck of femur
 - Trochanteric + cruciate anastomosis provides connection between internal iliac & femoral arteries
 - after ligation of femoral artery above profunda femoris artery the collateral circulation is by cruciate & anastomosis around ASIS.

ANASTOMOSIS OF LOWER L.



NERVES OF LOWER LIMB

2007

I. FEMORAL N.

** Beginning :- from lumbar plexus (L₂₋₃₋₄) - (dorsal divisions). ↗ largest branch.

** End :- By dividing into anterior & posterior divisions after 4 cm (1½ inch) below inguinal ligament.

** Course :- Enters the thigh behind inguinal lig. at the Lateral border of psoas major (between it & iliacus).
- It descends in femoral triangle, out side femoral sheath

** Branches :- A. from anterior division :-

① Muscular (2) :- to Sartorius & pectineus.

② Cutaneous (2) :- Medial & intermediate cut. N. of thigh.

B. from posterior division :- + vasoconstrictor br. to femoral artery

① Muscular (1) :- to quadriceps ms.

② Cutaneous (1) :- Saphenous nerve. ↗ N. to vasti

③ Articular (2) :- articular br. to knee & hip joints. ↗ N. to quadriceps

N.B → femoral N. supplies iliacus ms. inside abdomen.

Saphenous N. :-

- It is a branch of posterior division of femoral nerve.

- Leaves the femoral triangle & enters into adductor

canal medial to femoral artery behind sartorius

- becomes superficial ^{→ passing between sartorius & gracilis.} & descends at medial side of

knee & leg ^{→ accompanied by great saphenous vein} up to medial border of foot (up to

the ball of big toe). in front of medial malleolus.

N.B → subsartorial plexus of nerve : is formed by branches of :-

- ① saphenous N. ② obturator N. (ant. division) and
- ③ medial cut. N. of thigh.

II - OBTURATOR N.

** Beginning :- from lumbar plexus - (L2.3.4) - (ventral divisions).

** End :- By dividing into anterior & posterior division by adductor brevis ms. in medial compartment of thigh.

** Course - Enters the thigh through obturator canal at the medial border of psoas major.

** Branches :- [A] from anterior division :

① Articular :- to hip joint.

② Muscular (3) :- to adductor longus, brevis & gracilis.

③ Cutaneous :- to medial side of skin of thigh.

• occasionally the pectenous
• contribute to subsartorial plexus
• vasoconstrictor to femoral artery

[B] - from posterior division :-

① Articular :- to knee joint. "passing through add. hiatus"

② Muscular ($\frac{1}{2}$) - to obturator externus & $\frac{1}{2}$ of adductor magnus (pubic part).

• occasionally add. brevis
• vasoconstrictor to popliteal a.

III - SCIATIC NERVE

** Beginning - from sacral plexus (L4.5. S1.2.3) - (the largest nerve in body).

** End :- By dividing into 2 terminal branches

① Tibial N. (medial popliteal N.).

② Common peroneal N. (lateral popliteal N.)

- It ends most commonly at lower $\frac{1}{3}$ of thigh
(but may divide at $\frac{1}{2}$ of thigh & some times divided from the pelvis)

- It consists of tibial portion & common peroneal portion
Connected by fascia (connective tissue).

**** Course of sciatic N:-** leaves the pelvis and enters the gluteal region through greater sciatic foramen below piriformis muscle

- It lies on the following from above downward → ischial spine, sup. gemellus, obt. internus, inf. gemellus, quadratus femoris & adductor magnus (sciatic bed) ant. relation
- It related posteriorly to post. cut. N. of thigh & the gluteus maximus, biceps femoris & semimembranosus.
- It leaves the gluteal by passing deep to biceps (long head) & descends in the middle of thigh above adductor magnus (ischial part ^{or} hamstring part).
- It ends by dividing into 2 terminal branches.

**** Branches of sciatic N:-**

- ① Tibial nerve
- ② Common peroneal N.
- ③ Muscular branches: to the muscles of post. compart. of thigh through tibial portion (except short head of biceps by common peroneal portion of sciatic).
- ④ Articular :- to hip & knee (by tibial & common peroneal respectively)

ST. SM. biceps (long head)
add. magnus (hamstring part)

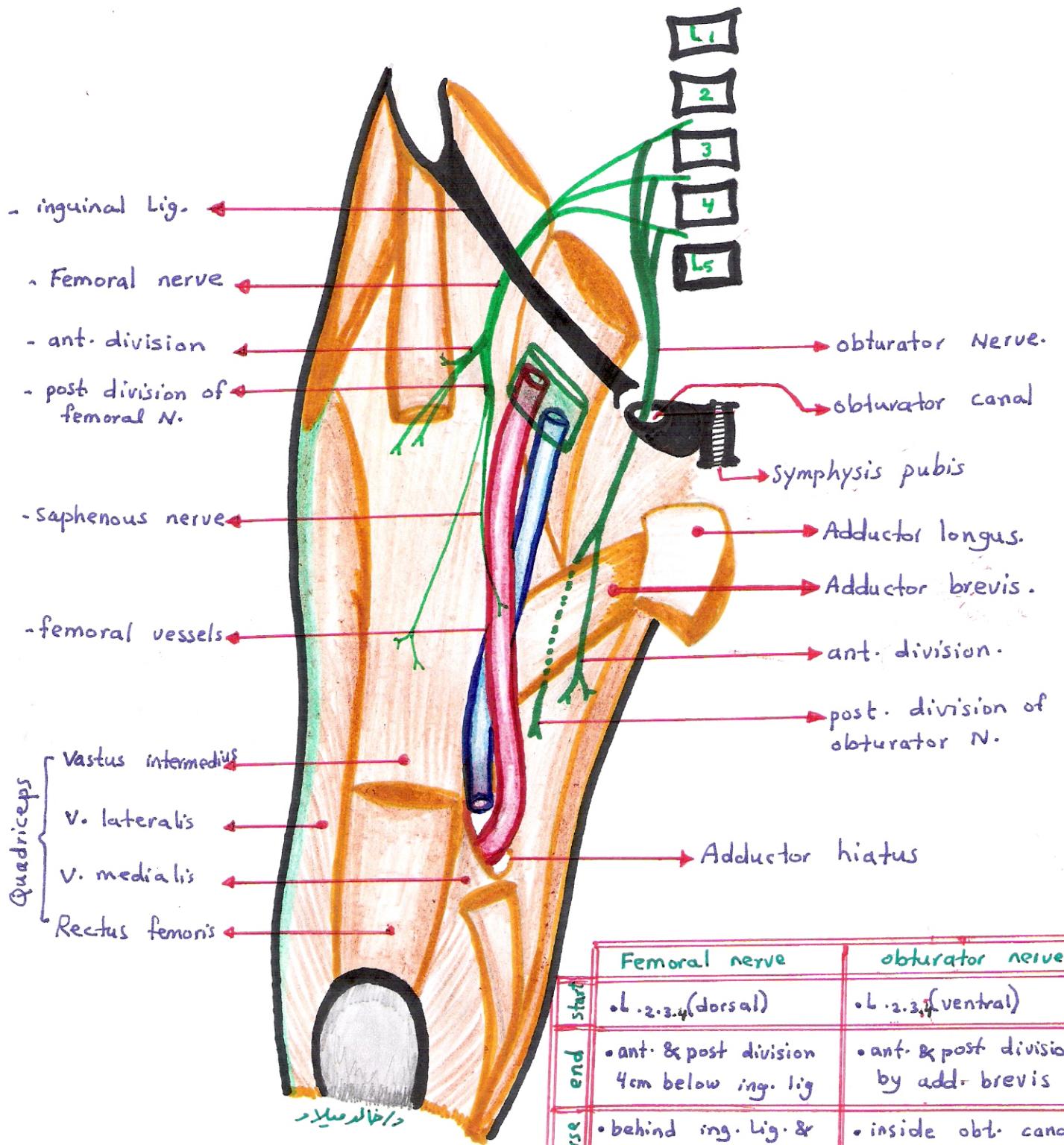
Surface anatomy of the sciatic N:- in the lower medial quadrant of gluteal region then middle of thigh (post).

Surface anatomy of the femoral N:- at midpoint of inguinal lig. (between ASIS & pubic tubercle).

Surface anatomy of the femoral artery:- at mid guinal point i.e (between ASIS & symphysis pubis); passing toward adductor tubercle.

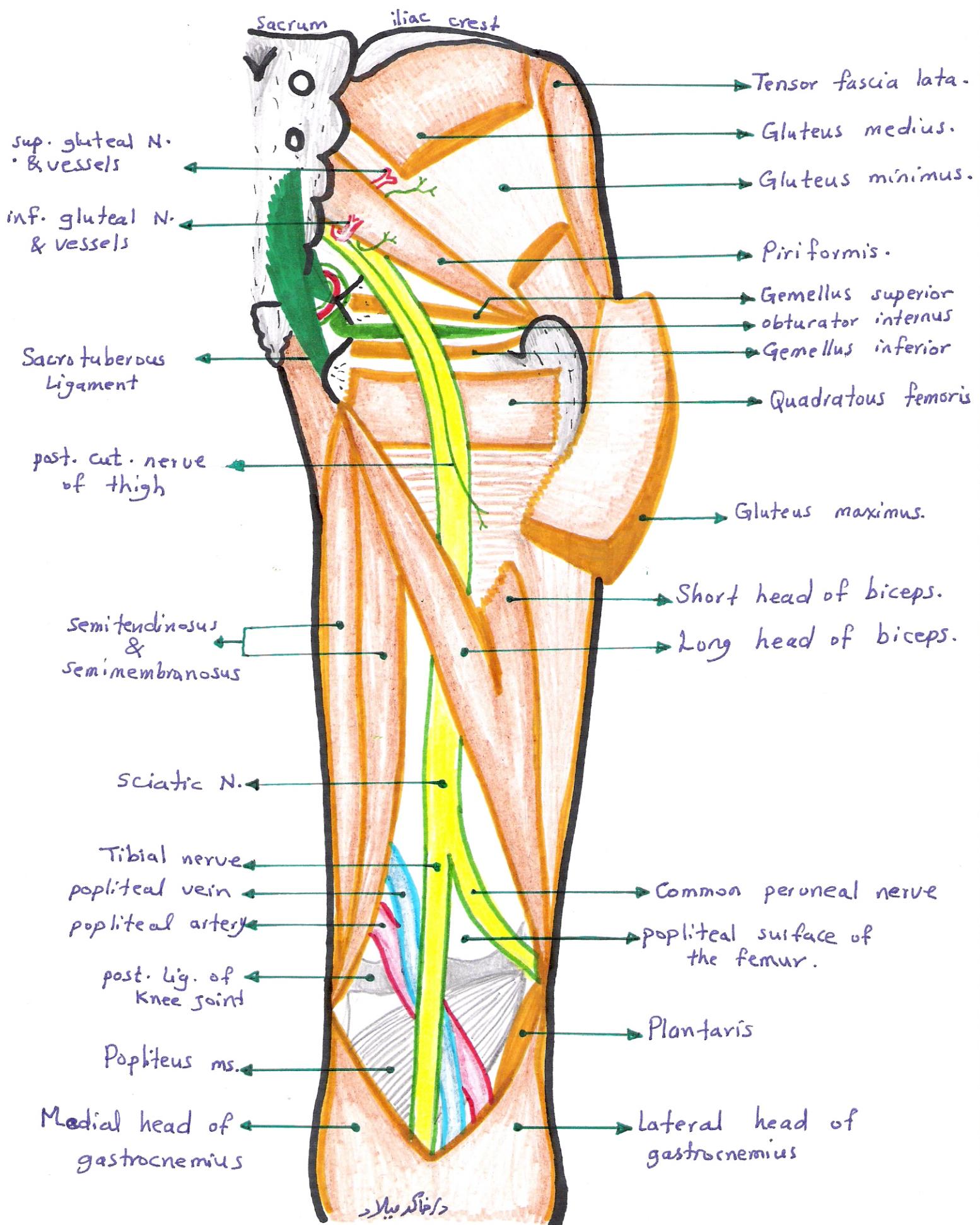
N.B:- the safest site for intramuscular injection is the upper lateral quadrant of gluteal region.

"FEMORAL & OBTURATOR NERVES"



	Femoral nerve	obturator nerve
start	L2-3,4 (dorsal)	L2-3,4 (ventral)
end	• ant. & post division 4cm below ing. lig	• ant. & post division by add. brevis
course	• behind ing. Lig. & lat. to psoas	• inside obt. canal & medial to psoas
Branches	<ul style="list-style-type: none"> (Ant) <ul style="list-style-type: none"> M₂ → Sartorius & pecten Cut₂ → MCN, ICN, thigh (Post) <ul style="list-style-type: none"> M₁ → quadriceps Cut₁ → Saphenous art. → hip & knee 	<ul style="list-style-type: none"> (Ant) <ul style="list-style-type: none"> M₃ → AB, AL, Gr. Art → hip. Cut. → Medial side of thigh (Post) <ul style="list-style-type: none"> M_{1,2} → DE, Y₂, AM Art → knee Cut → NO

BACK OF THIGH + GLUTEAL REGION



IV- TIBIAL NERVE:

• **Begining** : The larger terminal br. of sciatic nerve.
(Anterior divisions of L4.5. S1.2.3)

• **End** : In plantar surface by dividing into medial & lateral plantar nerves (terminal branches).

• **Course** : • In popliteal fossa : (called medial popliteal N.)

- enters the fossa from upper angle & leaves it from the lower angle running with popliteal artery [first Lateral then superficial & finally medial to the artery].

M
↓
S
↓
M - always the popliteal vein separates the artery from tibial N.

• In the leg : (called Posterior tibial N.).

- enters the leg (post. compartment) between [soleus & gastrocnemius] above it & [tibia & tibialis posterior ms] below it.

M
↓
S
↓
L - running with posterior tibial artery [the nerve first medial then superficial & finally Lateral to the artery].

L - leaves the leg by passing deep to flexor retinaculum with artery (between Flexor Digit. longus & Flexor Hallucis longus). (TDVNH)

• **Branches** : In popliteal fossa :

- ① Muscular :- Popliteus, gastrocnemius, soleus & plantaris
- ② Cutaneous :- Sural N. (skin of calf, foot-lateral border & little toe)
- ③ Articular :- Knee joint → by
 - sup. medial genicular N. ↓ lat-side
 - middle " "
 - inf. medial " "

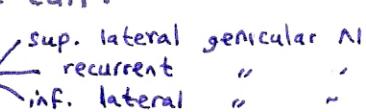
In the leg :

- ① Muscular :- Tibialis posterior, F. digit. longus, F. hallucis longus, Soleus
- ② Cutaneous :- medial calcaneal, medial & lateral plantar N.
- ③ Articular :- ankle joint.

N.B :- terminal branches are :- medial & lateral plantar nerve.

- Sural N. descends between 2 heads of gastrocnemius
- Sural N. accompanied by small saphenous vein behind medial malleolus.

V - COMMON PERONEAL N.

- **Beginning**: The smaller terminal br. of sciatic nerve (Posterior divisions of L₄₋₅, S₁₋₂₋₃). (called Lat. Popliteal N)
- **End** :- Inside peroneus longus Lateral to neck of fibula by dividing into ① superficial peroneal N. (musculocutaneous N.) & ② Deep peroneal N. (Anterior tibial N.).
- **Course**:
 - enters the popliteal fossa from upper angle &
 - leaves the fossa from lateral angle following medial border of biceps femoris above gastrocnemius.
 - Passes behind head of fibula & rounds around the neck of fibula (subcutaneous → can be palpable)
- **Branches**:
 - ① Muscular :- short head of biceps femoris.
 - ② Cutaneous :- Sural communicating br → joins the sural N. - Lateral cut. N. of Calf.
 - ③ Articular :- Knee joint. by 

N.B.: Terminal branches are superficial & deep peroneal Nerves.

VI - SUPERFICIAL PERONEAL N.

- **Beginning** : Terminal br. of common peroneal inside peroneus longus.
- **End** : Piercing deep fascia & becomes cutaneous nerve at lower Part of leg dividing into medial & lateral branches.
- **Course** : - running with ^{peroneal artery} _{running with} in lateral compartment between peroneus longus & brevis.
- **Branches**:
 - ① Muscular :- to peroneus longus & brevis.
 - ② Cutaneous = to skin at dorsum of foot & all toes [except adjacent sides between 1st & 2nd by deep peroneal & lateral side of little toe by sural N.]

VII DEEP PERONEAL N.

- **Beginning**: Terminal br. of common. Peroneal inside Peroneus longus.
- **End** : by dividing into medial & lateral branches at dorsum of foot after passing deep to extensor retinaculum on Lateral side of dorsalis pedis artery.

• **Course** :- enters anterior compart. of leg by piercing anterior fascial septum then deep to extensor digitorum.

L
S
L - running with anterior tibial artery [the nerve is first Lateral, then superficial & finally lateral to \bar{a} .]

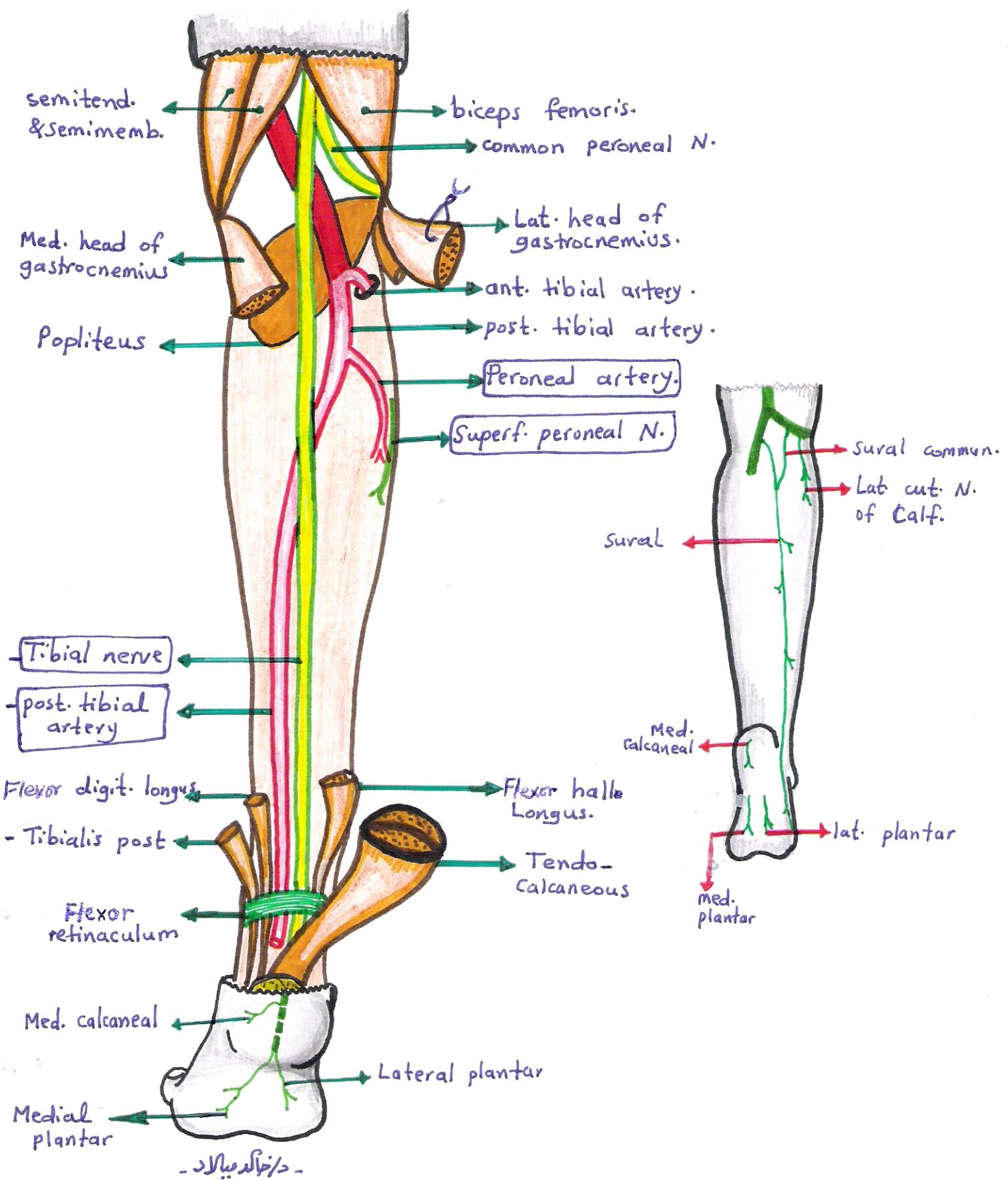
• **Branches:** ① Muscular :- Tibialis anterior, Peroneus tertius, ext. digitorum longus & ext. hallucis longus. (extensor digitorum brevis by Lateral br.)

② Cutaneous :- to adjacent sides of 1st & 2nd toes
(by Medial branch of the nerve).

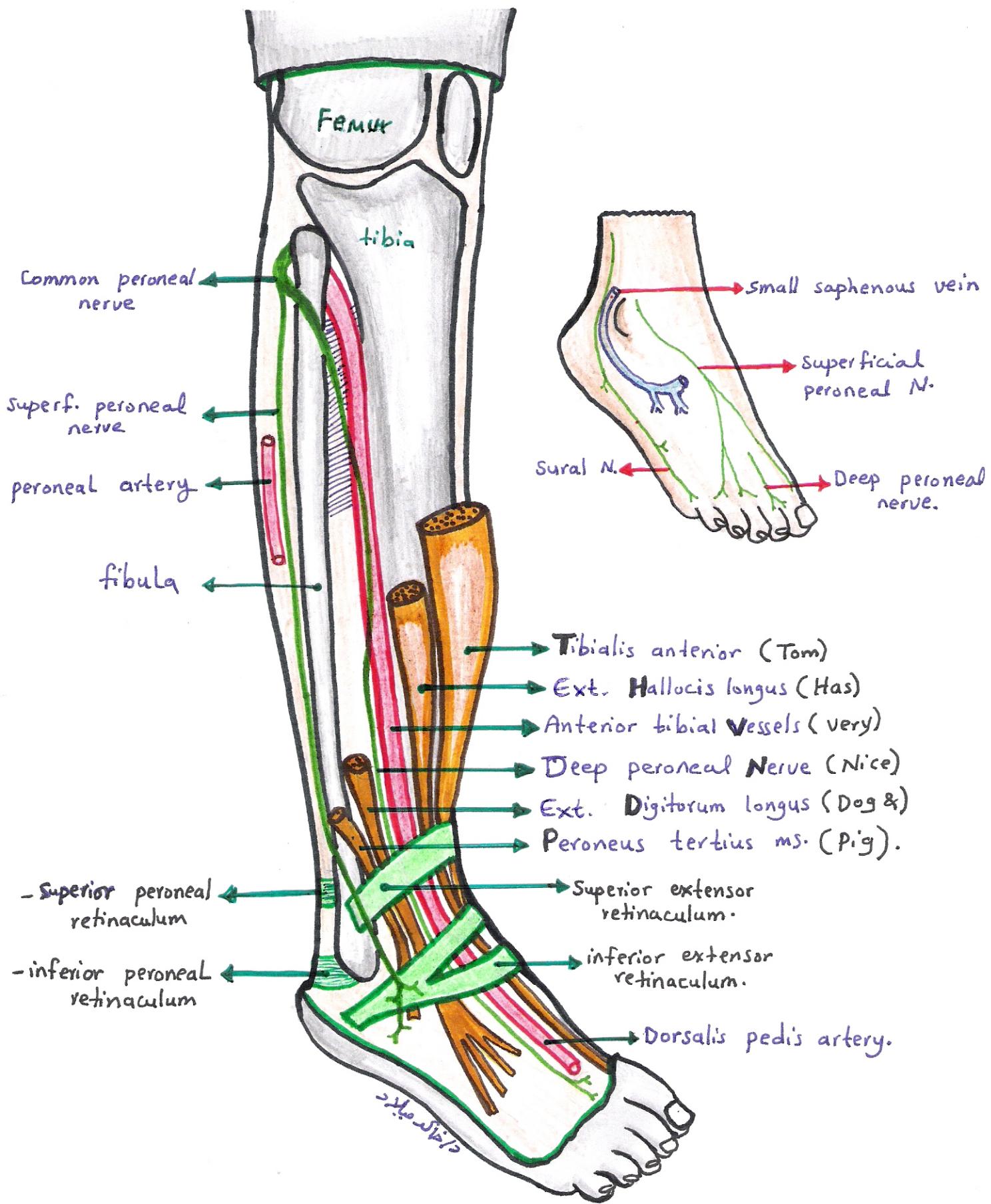
③ Articular: to ankle & joints of foot.
↳ by deep peroneal N.
↳ by medial & lateral plantar branches

	Tibial Nerve	Common peroneal	superf. peroneal	Deep peroneal N
Begin.	Terminal br of sciatic (Larger)	Terminal br sciatic (smaller)	Terminal of common peroneal (smaller)	Terminal of common peroneal (larger)
End	Med. & Lat plantar N.	superf. & deep peron.	at skin of dorsum (cutaneous)	between 1 st & 2 nd toes (dorsum)
Branch	$\ast\ast$ [in popliteal fossa] <ul style="list-style-type: none"> ① Ms \rightarrow P. Gc. S. PL. ② cut \rightarrow sural ③ art. \rightarrow knee $\ast\ast$ [in the leg] <ul style="list-style-type: none"> ① Ms \rightarrow Tp. FDL. FHL ② cut. \rightarrow Med. calcaneal, Med. & Lat. plantar ③ art. \rightarrow ankle 	<ul style="list-style-type: none"> ① Ms \rightarrow biceps (short head) ② cut \rightarrow sural comm. LCN of calf ③ art \rightarrow knee 	<ul style="list-style-type: none"> ① Ms \rightarrow PL. PB. ② cut \rightarrow dorsum of foot - 	<ul style="list-style-type: none"> ① Ms \rightarrow Ta. EHL. EDL EDB. PT ② cut \rightarrow dorsum of foot bet. 1st & 2nd toe ③ art \rightarrow ankle & Foot joints.
Course	running with posterior tibial artery	winds around neck of fibula	running with the peroneal artery	running with anterior tibial artery.

BACK OF LEG



FRONT OF LEG



COMPARTMENTS OF L.L.

THIGH COMPARTMENTS :-

*Contents of anterior fascial compartment :-

- Muscles :- sartorius, iliacus, psoas major, pectineus & quadriceps (vastus medialis, lateralis, intermedius & rectus femoris).
- Blood supply: femoral artery.
- Nerve supply: femoral nerve

all muscles of ant. compartment are supplied by femoral nerve except psoas major by lumbar plexus.

*Contents of medial compartment :-

- Muscles :- adductor magnus, add. brevis, add. longus, gracilis & obturator externus.
- Blood supply: obturator artery & Profunda femoris artery.
- Nerve supply: obturator nerve.

all muscles of medial compartment are supplied by obturator nerve except hamstring portion of add. magnus by sciatic N. (tibial portion).

*Contents of posterior compartment :-

- Muscles: Biceps femoris, semitendinosus, semimembranosus & hamstring portion of add. magnus
- Blood supply: Profunda femoris artery.
- Nerve supply: sciatic nerve.

all muscles of posterior compartment are supplied by tibial portion of sciatic N. except short head of biceps by common peroneal portion of sciatic

LEG COMPARTMENT :-

* Contents of ant. compartment :-

- Muscles :- Tibialis anterior, extensor Hallucis longus, extensor Digitorum longus & Peroneus tertius.
- Blood supply :- anterior tibial artery.
- Nerve supply :- deep peroneal nerve.

* Contents of Posterior compartment :-

- Muscles :-
 - Ⓐ superficial group :- Gastrocnemius, Plantaris & soleus.
 - Ⓑ deep group :- Tibialis posterior, flexor Hallucis longus, flexor Digitorum longus & Popliteus.
- Blood supply :- Posterior tibial artery.
- Nerve supply :- Tibial nerve.

* Contents of lateral compartment :-

- Muscles :- Peroneus longus & Peroneus brevis.
- Blood supply :- Peroneal artery.
- Nerve supply :- superficial peroneal nerve.

REGION OF ANKLE

ANTERIOR ASPECT :

* Superior extensor retinaculum :-

- Thickened band of deep fascia.
- Attached to distal ends of anterior borders of fibula & tibia (near its medial end, splits to enclose tendon of tibialis anterior)

* Inferior extensor retinaculum :-

- Thickened Y-shaped band of deep fascia.
- Attached by - its stem to calcaneum (in upper surface of anterior part).
 - upper limb of Y to medial malleolus
 - lower limb of Y to Plantar fascia
- (it is separated into compartments by fibrous septa separate the tendons and are lined by synovial sheet).

* structures Pass anterior (superf.) to ext. retinaculum :-

- ① Saphenous nerve & great saphenous vein (front medial malleolus).
- ② Superficial peroneal nerve (medial & lateral branches).

* structures Pass through (deep) to ext. retinaculum :-

- ① Tibialis anterior tendon. (Tom)
- ② - Extensor Hallucis longus. (Has)
- ③ - Anterior tibial Vessels. (Very)
- ④ - Deep peroneal Nerve. (Nice)
- ⑤ - Extensor Digitorum longus tendon. (Dog) & (Pig).
- ⑥ - Peroneus tertius.

POSTERIOR ASPECT

* Superior Peroneal retinaculum :-

- Lies behind lateral malleolus over perineus longus & brevis.
- Attached above to lateral malleolus & below to calcaneus.

* Inferior Peroneal retinaculum :-

- lies behind lateral malleolus over perineus longus & brevis.
- Attached above & below to calcaneus (continue above to stem of ext. Reti. ^{inf.})

* Flexor retinaculum :-

- Lies below & behind medial malleolus.

- attached above to medial malleolus & below to calcaneus (med. tubercle)

* Structures Passing deep to flexor retinaculum:-

(Behind medial malleolus):

- ① - Tibialis posterior tendon. (Tom)
- ② - Flexor Digitorum longus. (Does)
- ③ - Posterior tibial Vessels. (Very)
- ④ - Tibial Nerve. (Nice)
- ⑤ - Flexor Hallucis longus (Hat)

NB:- superficial to superior peroneal retinaculum → sural nerve & small saphenous vein.

NB:- Directly behind the ankle → tendocalcaneus & fat.